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CFD analysis on the effect of winglet cant angle on aerodynamics of ONERA M6 wing (Article)

Munshi, A.[a], Sulaeman, E.[a], Omar, N.[a], Ali, M.Y.[b]

[a]Department of Mechanical Engineering, Faculty of Engineering, International Islamic University Malaysia, Kuala Lumpur, Malaysia
[b]Department of Manufacturing and Material Engineering, Faculty of Engineering, International Islamic University Malaysia, Kuala Lumpur, Malaysia

Abstract

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Winglets are one of important part of the wing that can reduce the vortex formed at the wing tips and therefore reduce induced drag by partial recovery of the tip vortex energy. Moreover, they increase the effective aspect ratio without actually increasing the wingspan. The geometry of the winglets plays an important role in their task. In the present research, computation of lift and drag of ONERA M6 wing have been conducted using ANSYS Fluent. The results have been validated with the NASA results. Flow features of the entire wing including winglet were examined at different cant angles of winglets of 30°, 60° and 75° at different angles of attack from 3° to 6°. It is observed that among the cases of this study, wings with winglets produces higher C_L/C_D ratio than the normal aircraft wing without winglets up to certain degree of angle of attack and by further increasing to higher angle of attack its performance getting diminished. The investigated concept of adaptable angle winglets appears to be a likely substitute for refining the aerodynamic effectiveness of an aircraft. © 2018 Penerbit Akademia Baru.

Author keywords

CFD | Computational fluid dynamics | Swept wing | Transonic | Winglet

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